Inorganic Analysis Request Sheet

Definitions and Requirements for Testing

The information contained below is referenced in charts listing the analytes, required containers for collection, preservatives, and analytical holding times. The charts should be self-explanatory.

Environmental Microbiology

The Environmental Microbiology Sections of the Microbiology Laboratories perform the tests as listed on the Inorganic Analysis Request Sheet. For bottle requirements and holding times refer to Chart **V - 1** ENVIRONMENTAL MICROBIOLOGY TESTS, page **VI - 14**.

Ambient Parameters

Ambient Parameters is a group of analyses used by the Water Pollution Control Division of the Tennessee Department of Environment and Conservation. Refer to Chart **VI - 2** Inorganic Chemistry: Sample Containers, Preservatives, and Holding Times

General Inorganics

The General Inorganic section of the Inorganic Analysis Request Sheet lists a wide variety of tests. It is important to pay close attention to the chart because of the variety of tests and their collection requirements. Bottle types, preservatives, and holding times vary. Be aware of the tests that you need and make sure you have the proper collection vessels before going into the field. The laboratory will assist you by supplying the necessary vessels. Refer to Chart **V - 2** Inorganic Chemistry: Sample Containers, Preservatives, and Holding Times

Metals

The Metals Section is self-explanatory. If there are some metals you need that are not listed, please contact the laboratory. Refer to Chart **VI - 2** Inorganic Chemistry: Sample Containers, Preservatives, and Holding Times. Please note that we request you use a separate vessel for collection of mercury whenever possible We ask for the separate bottle simply for volume requirements. We want to make sure that there is enough sample volume to analyze for all your requested metals and have enough for quality control analysis.

Toxicity Characteristic Leaching Procedure (TCLP)

The TCLP test is used to simulate the mobility of inorganic and organic contaminants present in liquid, solid, and multiphasic wastes. In the Metals Section we measure the mobility of eight metals regulated under the toxicity characteristic: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. We also perform TCLP on nickel. Refer to Chart **VI - 2**, Inorganic Chemistry: Sample Containers, Preservatives, and Holding Times

Field Determinations

The tests listed here have traditionally been field procedures. These tests are specified in EPA protocol to be tested immediately at the point of collection. This gives the most accurate result for these parameters. We can and do test these parameters in the laboratory as you have need. Refer to Chart **VI - 2**, Inorganic Chemistry: Sample Containers, Preservatives, and Holding Times for the necessary information.

State of Tennessee - Environmental Laboratories

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Inorganic Analysis

PROJECT/SITE NO.	PROJECT NAME
STATION NUMBER	COUNTY
DESCRIPTION	
STREAM MILE	DEPTH MATRIX
COLLECTED: DATE	TIME
SAMPLER'S NAME(printed)	
SAMPLING AGENCY	BILLING CODE
IF PRIORITY, DATE NEEDED	
SEND REPORT TO:	
CONTACT HAZARD	

*	Env. Microbiology
	coliform, fecal*
	coliform, total*
	strep, fecal*
	E. Coli*
	Enterococcus*
*	**Ambient Parameters**
	COD*
	coliform, fecal
	conductivity*
	hardness, total as $CaCO_3$*
	nitrogen, ammonia
	nitrogen, NO_3 & NO_2
	nitrogen, total Kjeldahl
	phosphate, total
	pH
	residue, dissolved*
	residue, suspended*
	arsenic, As
	cadmium, Cd
	chromium, Cr
	copper, Cu
	lead, Pb
	mercury, Hg
	nickel, Ni
	zinc, Zn

*	General Inorganics
	acidity as $CaCO_3$*
	alkalinity as $CaCO_3$*
	alkalinity, phen. as $CaCO_3$*
	BOD, 5-day*
	CBOD, 5-day*
	boron
	chloride*
	chlorine, residual*
	chromium, hexavalent
	COD*
	color, apparent*
	color, true*
	conductivity*
	cyanide
	flash point*
	fluoride*
	hardness, Ca as $CaCO_3$*
	hardness, total as $CaCO_3$*
	hydrocarbons, total
	MBAS*
	nitrogen, ammonia
	nitrogen, nitrate*
	nitrogen, nitrite*
	nitrogen, NO_3 & NO_2
	nitrogen, total Kjeldahl
	nitrogen, total organic

	Gen. Inorganics (con't)
	oil and grease
	orthophosphate, total*
	oxygen, dissolved*
	pH
	phenols, total
	phosphate, total
	residue, dissolved*
	residue, settleable*
	residue, suspended*
	residue, total*
	silica*
	sulfate*
	sulfide, total*
	TOC*
	turbidity*
	percent solids
*	**Asbestos**
	bulk asbestos
	other microscopic
*	**Other**

*	Metals
	aluminum, Al
	antimony, Sb
	arsenic, As
	barium, Ba
	beryllium, Be
	cadmium, Cd
	calcium, Ca
	chromium, Cr
	cobalt, Co
	copper, Cu
	iron, Fe
	lead, Pb
	magnesium, Mg
	manganese, Mn
	mercury, Hg
	nickel, Ni
	potassium, K
	selenium, Se
	silver, Ag
	sodium, Na
	thallium, Tl
	vanadium, V
	zinc, Zn
*	**TCLP**
	arsenic, As
	barium, Ba
	cadmium, Cd
	chromium, Cr
	lead, Pb
	mercury, Hg
	nickel, Ni
	selenium, Se
	silver, Ag

** denotes analyses performed only on water*

FIELD DETERMINATIONS	Temperature
pH	Chlorine, residual
Conductivity	Other
Dissolved Oxygen	

Laboratory Number

Branch Lab Number

Chain of Custody and Supplemental Information

Only one chain of custody form is required per sample set or point (if all collected at the same time)

1. Collected by
   Date Time
   Delivered to
   Date Time
2. Received by
   Date Time
   Delivered to
   Date Time
3. Received by
   Date Time
   Delivered to
   Date Time
4. Received in Lab by
   Date Time
   Logged in by
   Date Time

Additional Information

1. Approximate volume of sample
2. Nearest town or city
3. Others present at collection
4. Number of other samples collected at same time at this point
5. Field collection procedure, handling and/or preservation of this sample
6. Mode of transportation to lab
7. Sample sealed by
8. Date sample sealed
9. Remarks

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Chart VI - 1
Environmental Microbiology Tests

ANALYTE	CONTAINER	HOLDING TIME
Coliform, fecal	125- or 250-ml plastic bottle * preserved with sodium thiosulfate; pack on ice after collecting.	6 hours
Coliform, total	125- or 250-ml plastic bottle *preserved with sodium thiosulfate.	48 hours
Strep, fecal	125- or 250-ml plastic bottle *preserved with sodium thiosulfate; pack on ice after collecting.	6 hours

* The collection bottle is labeled with two dates -- a preparation date and an expiration date.

Chart VI - 2
Inorganic Chemistry: Sample Containers, Preservatives, and Holding Times

General Inorganic Tests in Water	Bottle	Preservative	Holding Time
Routines			
Acidity	1 liter plastic	None	14 days
Alkalinity, Total	1 liter plastic	None	14 days
Alkalinity, Phenolphthalein	1 liter plastic	None	14 days
Chloride	1 liter plastic	None	28 days
Chlorine, Residual	1 liter plastic	None	Test immediately
Color Apparent	1 liter plastic	None	48 hours
Color, True	1 liter plastic	None	48 hours
Conductivity	1 liter plastic	None	28 days
Dissolved Oxygen	1 liter plastic	None	Test immediately
Fluoride	1 liter plastic	None	28 days
Hardness, Calcium	1 liter plastic	None	14 days
Hardness, Total	1 liter plastic	None	14 days
Hexavalent Chromium	1 liter plastic	None	24 hours
Langlier Index	1 liter plastic	None	28 days
Methylene Blue Active Substances	1 liter plastic	None	48 hours
Nitrite	1 liter plastic	None	48 hours
Orthophosphate	1 liter plastic	None	48 hours
pH	1 liter plastic	None	Test immediately
Residue, Total	1 liter plastic	None	7 days
Residue, Dissolved	1 liter plastic	None	7 days
Residue, Suspended	1 liter plastic	None	7 days
Residue, Silica	1 liter plastic	None	7 days
Sulfate	1 liter plastic	None	28 days
Tannin & Lignin	1 liter plastic	None	28 days
Turbidity	1 liter plastic	None	48 hours
BOD 5 day	1 Gallon plastic	None	48 hours
CBOD 5day	1 Gallon plastic	None	48 hours
Nutrients			
Ammonia	500 ml plastic	Concentrated Sulfuric Acid 1ml	28 days
Carbon, Total Organic	500 ml plastic	Concentrated Sulfuric Acid 1ml	28 days
COD	500 ml plastic	Concentrated Sulfuric Acid 1ml	28 days
Nitrate & Nitrite	500 ml plastic	Concentrated Sulfuric Acid 1ml	28 days
Nitrogen, Total Kjeldahl (TKN)	500 ml plastic	Concentrated Sulfuric Acid 1ml	28 days
Nitrogen, Total Organic	500 ml plastic	Concentrated Sulfuric Acid 1ml	28 days
Phosphorus, Total	500 ml plastic	Concentrated Sulfuric Acid 1ml	28 days

Chart VI - 2
Inorganic Chemistry: Sample Containers, Preservatives, and Holding Times (continued)

General Inorganic: Miscellaneous			
Boron	500 ml plastic	Concentrated Hydrochloric acid, 2ml	6 months
Cyanide	1 liter plastic	At collection: If sulfide is present, add cadmium nitrate powder until lead acetate paper spot test is negative, then filter; add 0.6 g ascorbic acid if KI paper indicates chlorine then sodium hydroxide to pH >12	14 days
Flash Point	16 ounce glass jar	None	None Specified
Oil and Grease	1 liter glass wide mouth	Concentrated Sulfuric acid, 2ml	28 days
Total petroleum hydrocarbons	1 liter glass wide mouth	Concentrated Sulfuric acid, 2ml	28 days
Phenol	1 liter glass amber	Concentrated Sulfuric acid, 2ml	28 days
Sulfide	1 liter plastic	2 ml Zinc Acetate in the lab and then sodium hydroxide to pH >9 at collection	7 days
General Inorganic Tests in Solids	**Bottle**	**Preservative**	**Holding Time**
Ammonia	16 ounce glass jar	None	None
Boron	16 ounce glass jar	None	None
Cyanide	16 ounce glass jar	None	None
Hexavalent Chromium	16 ounce glass jar	None	None
Nitrate & Nitrite	16 ounce glass jar	None	None
Nitrogen, Total Kjeldahl	16 ounce glass jar	None	None
Oil & Grease	16 ounce glass jar	None	None
pH	16 ounce glass jar	None	None
Phenol	16 ounce glass jar	None	None
Phosphorus, Total	16 ounce glass jar	None	None
Total Petroleum Hydrocarbons	16 ounce glass jar	None	None
Metals Tests in Water			
All metals except mercury	1 liter plastic	Concentrated Nitric acid, 5 ml	6 months
Mercury	500 ml plastic	Concentrated Nitric acid, 2.5 ml	28 days
Metals Tests in Solids			
All metals including mercury	16 ounce glass jar	None	None
TCLP			

Arsenic	16 ounce glass jar	None	180 days from collection to extraction and 180 days from extraction to completion of analysis; 360 days total
Barium	16 ounce glass jar	None	
Cadmium	16 ounce glass jar	None	
Chromium	16 ounce glass jar	None	
Lead	16 ounce glass jar	None	
Nickel	16 ounce glass jar	None	
Selenium	16 ounce glass jar	None	
Silver	16 ounce glass jar	None	
Mercury	16 ounce glass jar	None	28 days from collection to extraction and 28 days from extraction to completion of analysis; 56 days total